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ABSTRACT

The teacher supply and demand problem is considered along three dimensions: (1) the aggregate balance between supply and demand, and the balance in different education specialties and different areas of the country; (2) the composition of the teacher work force, its age, and level of training; and (3) the apparent quality of the work force and the ability to attract highly qualified new teachers. Effects of the "baby boom" are discussed as they reflect a current general glut of teachers which may be so pervasive as to discourage potential teachers from entering training programs. This same demographic phenomenon is analyzed for its future implications; namely, that there will be a teacher shortage due to increasing birth rates. Three areas of critical teacher shortage--science, mathematics, and computer education--are cited as problems that have no immediately predictable solutions. General migration from north to south and an apparent increase in movement from urban to rural areas is considered in an examination of population trends. Suggestions are made for developing policies which may offer promise for improving the overall status of teaching. (JD)

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Flood Tides and Aging Swimmers: An Exploration into The Supply and Demand for Teachers[1]

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The flood tide of reform has hit the beaches of public education just as the swimmers are becoming older and arguably less prone to add new strokes to their repertoires. The beach is also thought to have become a bit shabby, littered with society's flotsam and jetsam, and less attractive to the more talented swimmers who have found the waters more pleasant and the buried treasures more plentiful elsewhere. The events raise the question of whether there will be enough strong swimmers left to endure the next wave of enrollment.

* * * *

Whatever reforms are instituted will be carried out by teachers, and thus, the composition of the teacher work force over the next two decades takes on substantial policy importance. The supply and demand balance problem can be

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considered along three dimensions. First, the aggregate balance between supply and demand, and the balance in different educational specialties and different areas of the country. Second, the composition of the teacher work force, its age and level of training. Third, the apparent quality of the work force and the ability to attract highly qualified new teachers.

The Status Of The Teacher Labor Force

Of Gluts and Shortages

There is currently a general glut of teachers, but the supply is rapidly falling to meet demand, and the belief in the presence of a glut may be so pervasive as to discourage potential teachers from entering training programs. In its latest projections, which we will examine, the National Center for Educational Statistics (NCES) asserts, "unless more college students go into teaching, the nation may be faced with a teacher shortage in the late 1980s." (Frankel and Gerald, 1982: 71) The current official projections suggest equilibrium in supply and demand by the end of the decade.

Two coinciding trends threaten the supply of teacher candidates in the late 1980s and 1990s when enrollments will advance

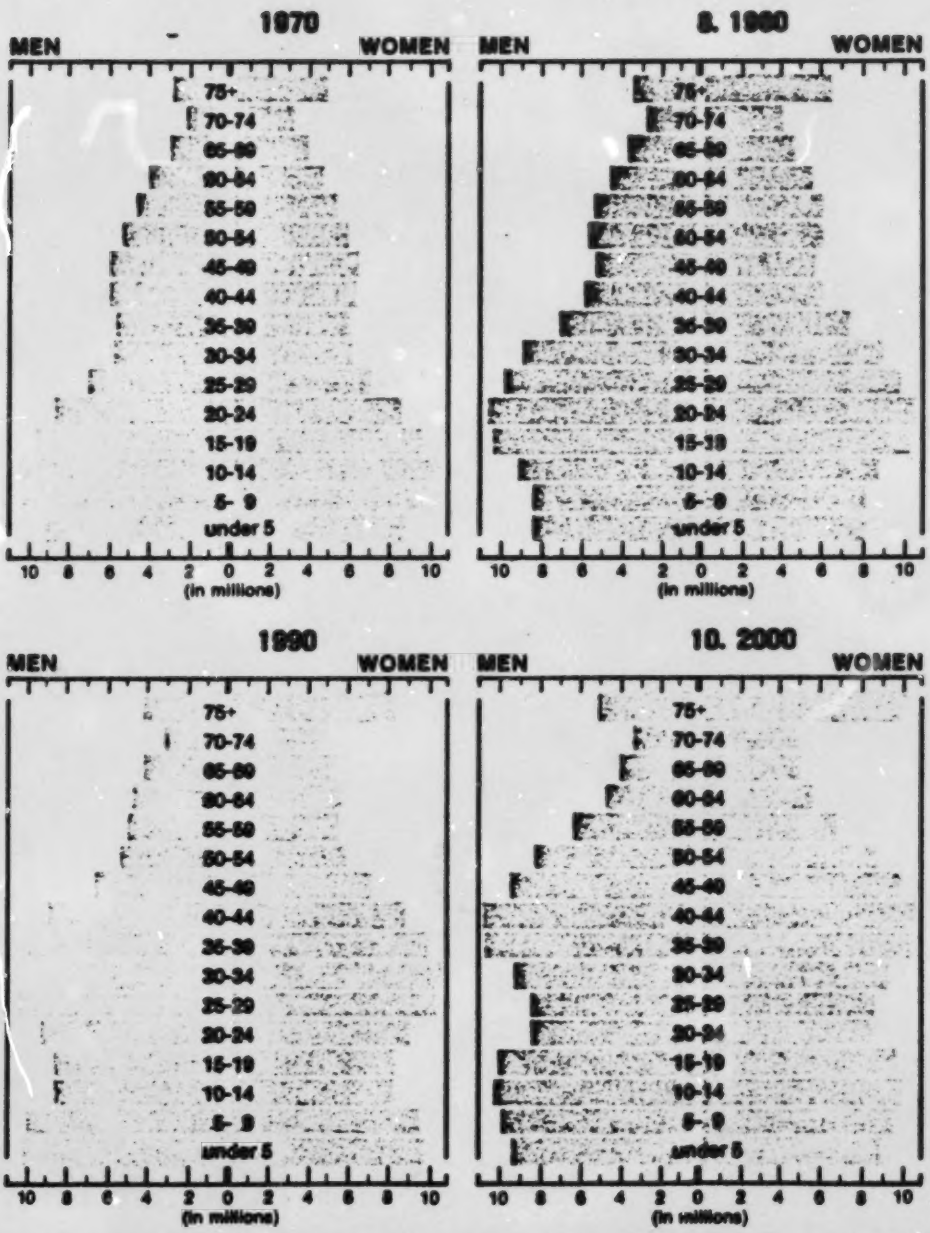
rapidy. First, teacher training has become far less popular, accounting for only about 11.6 percent of the bachelor's degrees offered in the country compared to 21 percent a decade earlier (Plisko, 1983: 184). The American Council on Education's 1982 survey showed less than 5 percent of full-time freshman students indicating elementary or secondary teaching as a probable career field (218). Second, over the next decade, the number of persons in the traditional college age cohort, 18 to 24 years, will decline by about 5-million or about 16 percent (Frankel and Gerald, 1982: 14). It is the mismatch between the college graduation cohort and the elementary and secondary education cohort that provides the most suggestive evidence that there may be general teacher shortages in the 1990s. At the time enrollments increase most rapidly, the supply of new college trained manpower will drop.

The Mouse and The Snake. The circumstance likely to cause this mismatch between teachers and students is the same work of nature that caused teacher dislocations in the recent past, the children of the Baby Boom. That unprecedented 19 years of fertility from 1946 to 1964 which produced 76-million babies is reproducing itself. The presence of this generation causes a violation of the conventional assumption about population distribution. The population pyramid is not a pyramid at all but a bulge, which as it ages moves through society like a mouse through a snake (Figure 1). At each stage, the mouse stretches the skeleton of

society serially distorting the demands for education, jobs, housing, and, in the near future, retirement.

Figure 1

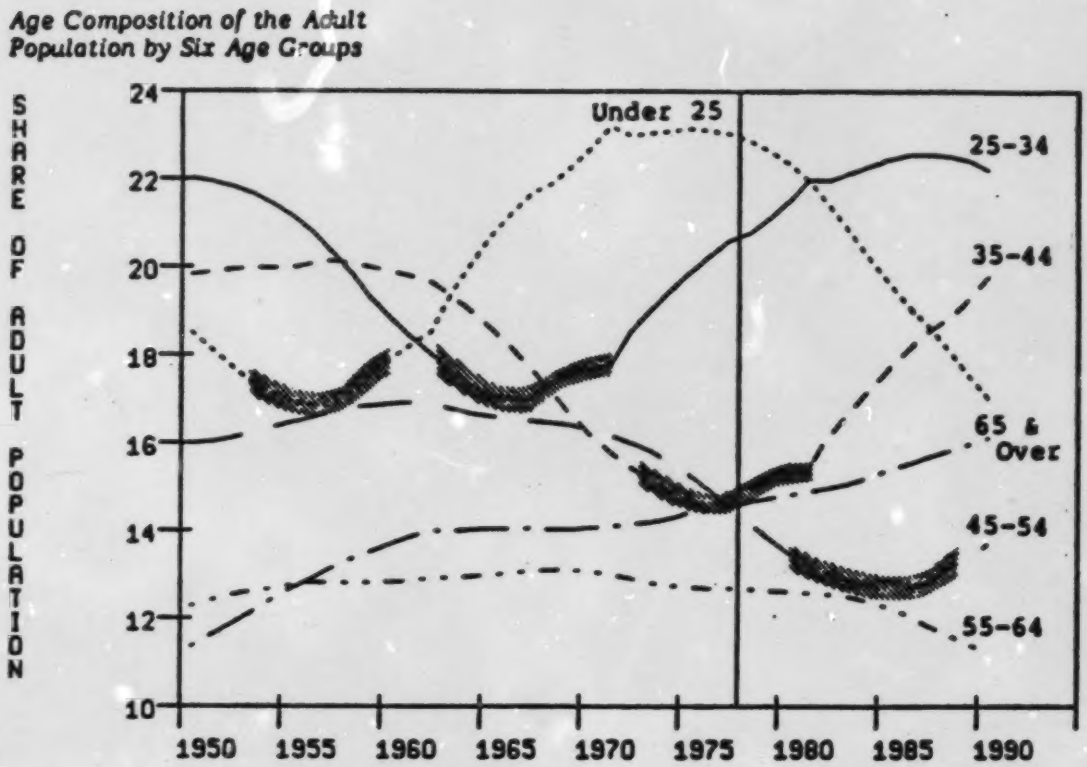
Population Pyramids, United States



SOURCE: U.S. Bureau of the Census, *Current Population Reports*, Series P-25, No. 870 and unpublished data.

Figure 2

Age Composition of the Adult Population



The population pyramid takes on added meaning if we translate it into a series of waves in which the different ages of the population are displayed in relationship to each other. For each decade, the composition of the country's population will be substantially different than it was in the preceeding decade (Figure 2). We see peaks and valleys coinciding. The late 60s and early 70s produced a tremendous peak in the under 25 year olds and a trough in the age group just ahead. This decade shows a bulge in the prime childbearing years and an echo in the newborn. That echo will become a smaller, yet significant swell in the enrollments of public education. Using a middle range (2.1 births per female of child bearing years) birth rate, we can expect elementary school enrollments will begin to rise nationally in 1986, and to increase in 1990 by about 3.2 million students to 30.3 million, an 11 percent increase. This is about the same enrollment as elementary schools had in 1976, but still 4 million shy of the 1969 peak of the Baby Boom. High schools, the object of most of the school reform discussion, should continue to decline through the decade and into the early 1990s losing 20 percent of their 1976 enrollment before turning upward. Thus, for the next decade, high school reform will have to take place within whatever constraints declining enrollments imply. For districts financially driven by property taxes, the decline in enrollment may actually serve to place more dollars behind each student, but to the extent that districts rely on student-driven finance mechanisms, resource levels are

threatened. Regardless, declining enrollments fight against economies of scale, increasing overhead and leaving the schools with an older, more expensive teacher corps.

The Hi-Tech Gap. The short-term general glut of teachers has until recently masked public notice of or concern for shortages in some teacher specialties particularly math and science. Specific shortages have now become apparent, and 32 states have now taken action to encourage the flow of applicants into math, science and comuter education (Education Week, 1983). In California, a state with a substantial stake in technologically based industry, some 500 teachers are employed on emergency credentials in mathematics or sciences in the state's eight largest school districts (Smith, 1973: 23). In the 20 teacher education programs of the University of California and California State University system there are only 97 individuals enrolled in single-subject mathematics credential programs and 174 in science programs.

Special education appeared as an area of high demand for teachers during the late 1970s. It quickly garnered students as the one area in teaching "where there were still jobs," and supply appears to be rising to meet student demand. The number of bachelor's degrees granted in special education increased by 67 percent during the 1970s and the number of master's degrees by 123 percent.

Bilingual education presents a more persistent problem. Particularly as one considers immigration in the Southwestern states, the need for bilingual teachers is likely to grow for some time. California projects a shortage of between 8,600 and 11,600 bilingual teachers this year.

Regional Diversity. In addition to substantial diversity by type of teacher, the question of demand for teachers is shaped by geography -- both regional variation and differences within regions. The surprises in the census of 1980, which put our numbers as 226,504,825, were not related to falling birth rates, for they had already been well recognized, but rather to the extensiveness of migration and of diversity in growth patterns among regions of the country. For the first time since the census was begun in 1790, rural areas -- which hold 25 percent of the total population, had faster rates of growth than did metropolitan areas (Hauser, 1981: 53). Where the whole United States grew by 11.4 percent during the decade, the non-metropolitan areas grew by 15.1 percent.

The Frostbelt-Sunbelt migration has been widely heralded, and indeed the 1970s saw substantial movements between regions of the country, and these are, in turn, reflected in the expected change in school age population by region. The large cities of the West and South grew rapidly: Denver-Boulder SMSA by 30.3 percent, San Diego 37 percent, Houston 44.6 percent, and Atlanta 26 percent. Those in the Northeast declined: New York SMSA lost 9 percent,

Boston, -4.8, and Pittsburgh -5.9, while the Nassau-Suffolk area of Long Island gained 1.9 percent. The metropolitan areas of the North Central region generally remained stable, although some of the central cities had substantial population losses as the suburbs gained. Some, like Cleveland, lost substantial central city population, -23.7 percent, and its suburbs had relatively small gains so that the entire SMSA lost 8.1 percent of its population. (Hauser, 1981: 57).

When considered together, the differences in migration, birthrate and the composition of the population suggest a divergence (Jackson, 1981: 12) among the regions rather than an echo of the standard assumption that differences among the regions are declining. The differences are distinctive and diverging in several respects, birth rates, concentration of different races and cultures, types of industries and their growth and decline, and some would argue distinctive cultures and expectations that shape politics and the demand for public services (Garreau, 1982).

Population migration, of course, shapes school enrollment, and as Figure 3 shows, gives quite different prospects for teacher demand for school districts throughout the country. For instance, during the same 5-year period elementary schools are expected to increase by nearly 22 percent in the mountain states while high schools in the mid-Atlantic states decline by nearly 17 percent. Local school district variations are even more

acute. Some inner-ring suburbs are following the rollercoaster ride of enrollment decline reported in the last decade by central cities. Niles Township in Illinois expects to lose about 80 percent of its peak enrollment. Other districts expect growth, the difference being accounted for both by the general growth and decline of the region and by the intraregional migrations in search of jobs and affordable housing. As a consequence, even contiguous school districts have quite different enrollment projections.

Figure 3

Projected Changes in School Age Population By Region

	1985-90	1990-95	1995-2000
United States Total			
5-13	9.40	9.50	-1.00
14-17	-3.50	4.50	16.30
New England			
5-13	5.00	10.20	-2.30
14-17	-14.30	-0.70	16.70
East North Central			
5-13	4.00	2.60	-7.20
14-17	-7.30	0.30	8.50
West North Central			
5-13	13.30	8.10	-3.60
14-17	-0.40	11.20	14.80
Mid Atlantic			
5-13	-1.00	-0.20	-9.50
14-17	-16.80	-3.90	4.20
South Atlantic			
5-13	6.60	10.40	-1.30
14-17	-4.20	-2.30	18.90
East South Central			
5-13	13.90	15.60	2.30
14-17	4.70	3.70	25.80
West South Central			
5-13	15.00	14.40	6.20
14-17	8.90	10.00	20.30
Mountain			
5-13	21.80	18.10	7.80
14-17	11.50	19.00	24.70
Pacific			
5-13	16.30	13.50	1.20
14-17	-1.00	13.30	20.30
Maximum increase	21.80	19.00	25.80
Maximum decrease	-16.80	-3.90	-9.50

Source: George Masnick and John Pitkin, "Cohort Projections of School-Age Populations for States and Regions: 1985-2000, MIT/Harvard Joint Center for Urban Studies, 1982.

Educators and Middlesence

Educators are getting older, but in comparison to the recent past they are not old. The average age of administrators is about 50 and of teachers 40, but it is the distribution of school employees by age that provides the most ready intuitive grasp of supply and demand in the near future. One notes a humped distribution of teachers in the middle years, ages 30 to 44 and the underrepresentation of both the very young and those close to traditional retirement age. In 1980 about 43 percent of the teaching force was between age 30 and 44; this compared to about 32 percent in 1960 and 1970. Only 8 percent of the teachers were under 25, less than half the proportion a decade earlier, and fewer than 10 percent were over 55. The distribution pointedly suggests that even with early retirement inducements, the teaching force we have now will form a substantial part of the teaching force the country is going to have for the next decade and a half. This labor force will have the advantages of stability and experience, but to the extent that the criticisms of the schools are intended as an indictment of the capability of the current teaching force, it would be unrealistic of us to expect that capability to change very much, very fast.

The shape of the current teaching and administrative force will

also have a substantial effect on the demand for new teachers. The relatively smaller percentage of teachers in the 55-65 age bracket suggests fewer retirements and the criticalness of retirement assumptions to projections of future teacher supply and demand.

Figure 5,

Age Distribution of Teachers in The U.S.

Total

Age	1960	1970	1971	1979
< 25	10.8	17.3	19.2	8.2
25-29	13.0	17.5	16.9	20.0
30-34	11.5	12.1	12.3	18.5
35-44	21.3	19.2	19.7	25.1
45-55	25.2	17.2	16.8	18.5
55-64	14.7	14.0	13.1	8.2
+ 65	3.2	2.7	2.0	1.5

Elementary

Age	1960	1970	1971	1979
< 25	11.4	17.1	20.9	9.0
25-29	12.1	16.1	17.3	22.5
30-34	10.8	10.3	11.3	16.9
35-44	20.2	19.1	17.4	24.6
45-55	26.8	18.3	15.7	16.9
55-64	15.3	15.5	14.9	8.5
+ 65	3.4	3.4	2.6	1.6

Secondary

Age	1960	1970	1971	1979
< 25	9.6	17.6	20.9	9.4
25-29	14.7	19.5	18.6	19.6
30-34	13.0	14.8	14.1	21.9
35-44	23.5	19.4	18.5	24.8
45-55	23.0	15.5	16.6	16.9
55-64	13.6	11.6	9.8	6.0
+ 65	2.6	1.6	1.5	1.5

Source: Sweet and Jacobson (1983: 201)

The Smart Go Elsewhere

The evidence is strong that as a portion of the college-trained those going into teaching are less academically capable than they were a decade or a generation ago. The decline of standardized test scores and other quality indicators has been well noted (Kerr, 1983: 127-130):

- SAT scores of those in teacher education programs have declined faster than those of other students. In 1971, the SAT verbal and math scores of education students exceeded national means (472/455; 506/488). By 1975 education scores had fallen below the mean, and they have remained there. California education students in 1982 scored well below national means on both verbal (399/426) and quantitative (424/466) portions of the SAT (Smith, 1983: 10).

- students entering teaching are ranked at the bottom compared to students entering other occupations. The 1982 California results ranked education students 27th in verbal ability and 28th in quantitative ability out of 30 occupational groups (Smith, 1983: 10).

- school districts tend not to hire the most academically capable of the students available (Weaver, 1979: 30).

- the most academically capable students tend to leave teaching more quickly than others (Schlecty and Vance, 1981).

At first, these changes appear surprising. There has been a drastic increase in college graduates as the baby boom has entered the labor market, and far more graduates have had to settle for "underemployment," jobs that in different times would not have attracted a college graduate. Moreover, female participation in the labor market has been at an historic high. One would think that teaching would appear more attractive in these circumstances, particularly so to females. But the operation of the labor market is such that these changes have served to make teaching a less attractive job choice rather than a more attractive one.

Labor supply is generally depicted as a queue with the most attractive potential workers in the front of the line. Those at the head of the line are generally widely attractive to employers and graduate schools. They have more options. In a situation of drastic oversupply, as is the case with teaching, it is those at the front of the line who can seek to exercise those options. The perceived presence of jobs attracts workers.

Secondly, teaching has become less economically attractive. Real wages of workers generally declined in the late 1970s, but teaching wages declined faster. Between 1978 and 1981 all

salaries of recent college graduates decreased from $16,000 to $15,300 (in 1981 dollars), but teachers' constant dollar income went down from $13,100 to $11,200 (Plisko, 1983: 128). Also, the average teacher salary in the United States has declined relative to the Department of Labor's standard for an intermediate standard of living. In 1972 teacher salaries were 88 percent of the intermediate standard for a family of four, but by 1980 salaries had declined to 77 percent of the standard (Ornstein, 1980: 677). In the wake of teacher layoffs, the occupation has also lost its appeal as a stable and secure job. The value of a teaching credential as a transportable and enduring claim on a job has disappeared.

Third, the labor market has served to open other options particularly for women. Law, medicine and business have opened to women who have responded by lining up at the doors of those institutions. This change is particularly important to public schools because teaching was historically among the best jobs identified as woman's work. Those who would have wished for other options in years past now have them, and are taking them.

Finally, and perhaps most importantly, teaching has become less intrinsically attractive. The occupation is not depicted as pleasant, rewarding or of substantial status in the public media, nor is it faddishly attractive as part of the *avant garde* as it was in some quarters during the years of the Great Society. A large number of teachers are actively dissatisfied with their

work and say that they would make other choices if they could.

Modeling The Labor Market for Teachers

The model which follows concerns itself with the aggregate supply and demand function, the problem of whether as a nation we run the risk of a widespread teacher shortage such as that which characterized the last Baby Boom.

The Demand Function

The demand function can be specified as follows:

1. Demand for new teachers at any level is $D_{ta} = (S_{ta}/R_{ta}) + FL - E_{ta}$, where

   1.1. S_{ta} = student enrollment at time t, in level a.

   1.2. R_{ta} = ratio of students to teachers at time t, in level a.

   1.3. S_{ta} is a function of the number of students in the next lowest level, the persistance of students from one level to the next, and the net migration: $S_{ta} = S_{t-1, a-1} \times P_{ta} + M_{ta}$, where

1.3.1. Pta= the persistence student coefficient

1.3.2. M_{ta} = net migration at time t, level a.

1.4. FL = the number of teachers leaving the field during that period.

1.5. E_{ta} = the number of experienced teachers available at that grade and time.

Enrollment Assumptions. I have used the NCES projections (Frankel and Gerald, 1982). For the years beyond 1990 I have used the population projections of the MIT/Harvard Joint Urban Studies Center (Maskick and Pitkin, 1982) converting population into public school enrollment at .95 for elementary enrollment and .65 for secondary. As shown in Figure 5, columns A, J, they show the expected pattern of increasing elementary enrollments in the latter half of the decade, and decreasing high school enrollments throughout.

Experienced Teachers. There were about 2,036,000 experience teachers working in public schools in 1981. Column D in Figure 5 calculates this body of experienced teachers based on last year's figure plus new teachers hired less those leaving the field.

Student-Teacher Ratios. Estimates of student-teacher ratios are among the most critical assumptions in any supply and demand model for teachers. At the current levels of enrollment and teacher employment, changing the ratio by one (from 20 to 21 for

rates for beginning teachers in his one-city sample were as high as 33 percent. Baugh and Stone (nd: 7) using a national sample found rates of 8 percent in 1974-75 and 11 percent in 1977-78. Sweet and Jacobson (1982) found rates in excess of 8 percent. The NCES has altered its turnover rate from 8 percent to 6 percent in recent years in response to a tighter job market and other factors, but is returning to an 8 percent turnover rate in projections for the 80s (Frankel and Gerald, 1982). As Sweet and Jacobsen (1983: 209-210) note, the NCES assumptions rest on a thin base of a 1968 survey of principals and two National Education Association surveys done in the mid-1960s. The intervening years, have been times of extraordinary change in working patterns particularly working patterns of females, and thus the basis of the turnover projection deserves closer scrutiny.

I have placed the turnover rate among experienced teachers at 6 percent reflecting: (1) the relatively small number of persons in the 55-65 age bracket, and (2) the rather large career bound cohorts that are following. However, in addition, I have suggested that a substantial number of less experienced teachers will leave, representing this number in demand calculations as 20 percent of the last year's new hires. Although the percentage of females who leave the labor force to raise children has dramatically decreased in the last 15 years, there is still a substantial departure. In addition, job movement is not at all

unusual among young employees. One single-city study placed the turnover rate among first year teachers at 33 percent (Murname, 1981: 14). The NEA survey of its members reports that 8 percent definitely plan to leave teaching as soon as possible and another 18 percent would leave if something better came along (Bartholomew and Gardner, 1982: 18).

The Supply Function

The supply of new teachers is a function of:

1. $W_{ta} = (B_{ta} \times A_{ta}) \times AL$, where

   1.1. B_{ta} = bachelor's degree graduates at time t, level a

   1.2. A_{ta} = the percentage of all bachelor's degree graduates attracted to teaching.

   1.3. AL = the percentage of teacher education graduates that seek employment in public school teaching.

2. Cumulative surplus or deficit of teachers (C) is: $C_{ta} = D_{ta} - (W_{ta} + U_{ta})$, where,

   2.1. U_{ta} = the number of unemployed teachers available in the labor pool.

Number of entrants to the labor market. Bachelor degree

graduates stand as a substantial simplification of the entrants into the labor market from which potential teachers are drawn. These are projected to peak in the mid-1980s and then decline rapidly as seen in Figure 5, Column H (NCES intermediate projections, Frankel and Gerald, 1982: 70). The figures for the 1990s are taken from the MIT/Harvard population projections assuming a college going rate similar to that of he 1980s.

Attractiveness of teaching. While there is substantial disagreement about the supply function for college-trained manpower, it is universally held that supply is attracted by the perception of increased demand (Freeman, 1971: 11; Thurow, 1972: 71). The glut of teacher applicants in the last decade has clearly been noticed by college students. As previously noted, bachelor's degrees in education as a portion of all bachelor's degrees have declined from 21 percent in 1971 to 11.6 percent in 1980, and professed interest in the field has declined also. The exact association of supply and changes in demand is in some dispute among manpower scholars, but all suggest that there is a lag representing the time when potential applicants recognize the presence of jobs and the period of time when new applicants appear in the labor market. In Figure 5, Column I, supply responds to the previous year's surplus or deficit of teachers. If there is a surplus of teachers the percentage of undergraduates studying for teaching declines by 1 percent; if there is a deficit the percentage increases by 1 percent.

Graduates available to teach. Not all teacher education graduates seek employment as teachers. Substantial numbers don't apply, 90 percent of them reporting that they don't want to teach and only 10 percent saying that they were discouraged from applying because they perceived there were no jobs available (Plisko, 1983: 216). In the recent past, about 85 percent of graduates have applied, and this percentage is used as the assumption in Figure 5, Column J in order to yield the total number of teacher graduates available, which is shown in Column K.

Unemployed Teachers. The approximation of the pool of unemployed, credentialed teachers is extremely rough, a recent NEA estimate putting the number at 120,000 being perhaps the best available. However, we have no reasonable way of knowing how this "reserve army" will behave in the labor market, whether they will willingly return to teaching or whether they are fixed in job choices elsewhere. For purposes of illustration, I have assumed that 75 percent of the cumulative surplus of teachers would be available in the following year (see column N).

Figure 5

Supply and Demand of Public School Teachers in the United States

(in thousands)

	ENROLLMENT K-8	9-12	Total	Exper'nced Teachers	Ratio	Leaving Field	Tot. Demand
	A	B	C	D	E	F	G
1981	27,361	12,833	40,194	2,036	18.90	122	91
1982	27,161	12,383	39,544	2,005	18.90	138	88
1983	27,023	12,142	39,165	1,954	18.90	135	118
1984	26,905	12,134	39,039	1,937	18.90	140	128
1985	26,951	12,215	39,166	1,926	18.90	141	147
1986	27,359	12,097	39,456	1,931	18.90	145	157
1987	27,987	11,817	39,804	1,942	18.90	148	164
1988	28,722	11,436	40,158	1,958	18.90	150	167
1989	29,447	11,158	40,605	1,975	18.90	152	174
1990	30,244	11,023	41,267	1,997	18.90	155	187
1991	31,100	11,190	42,290	2,029	18.90	159	209
1992	32,023	11,357	43,380	2,078	18.90	166	217
1993	32,946	11,525	44,471	2,129	18.90	171	224
1994	33,869	11,692	45,561	2,182	18.90	176	229
1995	34,792	11,859	46,651	2,235	18.90	180	233
1996	34,720	12,239	46,959	2,288	18.90	184	196
1997	34,648	12,620	47,268	2,301	18.90	177	200
1998	34,576	13,001	47,577	2,324	18.90	179	194
1999	34,504	13,381	47,885	2,338	18.90	179	196
2000	34,432	13,762	48,194	2,355	18.90	180	195

Figure 5, continued

Supply and Demand of Public School Teachers in the United States

(in thousands)

	Tot. BA	% of BA in Ed.	% Avail. teach	Teacher Grads. Available	Annual Surplus (Deficit)	Unemp-loyed teachers	Cumulative Surplus
	H	I	J	K	L	M	N
1981	932	0.14	0.85	111	20	84	104
1982	945	0.13	0.85	104	17	78	95
1983	965	0.12	0.85	98	(20)	71	51
1984	985	0.13	0.85	109	(19)	38	19
1985	985	0.14	0.85	117	(29)	14	(15)
1986	981	0.15	0.85	125	(31)	0	(47)
1987	970	0.16	0.85	132	(32)	0	(78)
1988	949	0.17	0.85	137	(29)	0	(108)
1989	938	0.18	0.85	144	(30)	0	(138)
1990	930	0.19	0.85	150	(37)	0	(175)
1991	926	0.20	0.85	157	(51)	0	(226)
1992	922	0.21	0.85	165	(52)	0	(278)
1993	919	0.22	0.85	172	(52)	0	(330)
1994	915	0.23	0.85	179	(50)	0	(380)
1995	911	0.24	0.85	186	(47)	0	(428)
1996	918	0.25	0.85	195	(1)	0	(429)
1997	924	0.26	0.85	204	4	0	(425)
1998	930	0.25	0.85	198	4	0	(421)
1999	936	0.24	0.85	191	(5)	0	(426)
2000	942	0.25	0.85	200	5	0	(421)

The Balance of Supply and Demand

These projections show an increasing deficit in teacher supply beginning in the mid 1980s and continuing for a decade. Annual surpluses are restored in the late 1990s but there continues to be a huge commulative shortfall in the numbers of trained teachers. By the year 2000, the shortfall is 421,000 (Figure 5, column N.) This is roughly 20 percent of the teacher labor force.

Reform and Labor Policy for Teachers

The Twenty Percent Solution

A 20 percent shortfall in the numbers of qualified teachers available appears as a massive problem, one which at first inspection calls for massive intervention. But there are serious dangers in overstimulation of the labor market. Besides the softness of the assumptions in the supply and demand model, there are a number of extremely ready steps that labor markets have available to deal with short run inbalances. Incentives for early retirement could be withdrawn, emergency credentials could

be granted as we see they are already being granted in math and science, part-time teaching or job sharing among could be encouraged among teachers who would otherwise leave the labor force. But the one simple adjustment that has extremely powerful effects on balancing supply and demand is to adjust the student-teacher ratio. If we run the same model and allow the student-teacher ratio to adjust to a teacher shortage by only .2 students per year, we substantially reduce the shortage and create a teacher surplus by the end of the century. The model run is shown in Figure 6.

Figure 6

Projection of Teacher Supply and Demand Allowing

Student-Teacher Ratio to Respond to Shortages

(in thousands)

	ENROLLMENT K-8	9-12	Total	Exper'nced Teachers	Ratio	Leaving Field	Tot. Demand
	A	B	C	D	E	F	G
1981	27,361	12,833	40,194	2,036	18.90	122	91
1982	27,161	12,383	39,544	2,005	18.89	138	89
1983	27,023	12,142	39,165	1,955	18.88	135	119
1984	26,905	12,134	39,039	1,939	19.08	140	107
1985	26,951	12,215	39,166	1,906	19.28	136	126
1986	27,359	12,097	39,456	1,896	19.48	139	130
1987	27,987	11,817	39,804	1,887	19.68	139	136
1988	28,722	11,436	40,158	1,883	19.88	140	137
1989	29,447	11,158	40,605	1,880	20.08	140	142
1990	30,244	11,023	41,267	1,882	20.28	141	153
1991	31,100	11,190	42,290	1,893	20.48	144	171
1992	32,023	11,357	43,380	1,921	20.68	150	177
1993	32,946	11,525	44,471	1,948	20.88	152	182
1994	33,869	11,692	45,561	1,978	21.08	155	184
1995	34,792	11,859	46,651	2,006	21.28	157	186
1996	34,720	12,239	46,959	2,035	21.48	159	151
1997	34,648	12,620	47,268	2,027	21.47	152	175
1998	34,576	13,001	47,577	2,050	21.46	158	167
1999	34,504	13,381	47,885	2,059	21.45	157	173
2000	34,432	13,762	48,194	2,075	21.65	159	151

Figure 6, continued

Projection of Teacher Supply and Demand Allowing

Student-Teacher Ratio to Respond to Shortages

(in thousands)

	Tot. BA	% of BA in Ed.	% Avail. teach	Teacher Grads. Available	Annual Surplus (Deficit)	Unemp-loyed teachers	Cumulative Surplus
	H	I	J	K	L	M	N
1981	932	0.14	0.85	111	20	84	104
1982	945	0.13	0.85	104	16	78	94
1983	965	0.12	0.85	98	(21)	70	49
1984	985	0.13	0.85	109	2	37	39
1985	985	0.14	0.85	117	(8)	29	21
1986	981	0.15	0.85	125	(5)	16	11
1987	970	0.16	0.85	132	(4)	8	4
1988	949	0.17	0.85	137	1	3	4
1989	938	0.18	0.85	144	1	3	4
1990	930	0.19	0.85	150	(3)	3	0
1991	926	0.20	0.85	157	(14)	0	(14)
1992	922	0.21	0.85	165	(12)	0	(26)
1993	919	0.22	0.85	172	(10)	0	(36)
1994	915	0.23	0.85	179	(5)	0	(41)
1995	911	0.24	0.85	186	0	0	(41)
1996	918	0.25	0.85	195	44	0	3
1997	924	0.24	0.85	188	14	2	16
1998	930	0.23	0.85	182	15	12	27
1999	936	0.22	0.85	175	2	20	22
2000	942	0.23	0.85	184	34	16	50

Composition of the Teacher Labor Force

If the aggregate supply and demand for teachers does not present a substantial policy problem, what about the composition of the teacher work force? The teacher labor force will age as the population ages, with teachers being somewhat older than the mean reflecting the expansion of teaching during the years when the population pyramid's bulge passed through school. The extent to which this represents a problem requiring policy response is partly a matter of taste and value, and this country's tastes have come to less explicitly value youthfulness. Now that we're mostly over 30, we've decided that we can be trusted.

But from the standpoint of school structural reform, the current composition of the labor market presents possibly serious organizational challenges. The distribution of rewards and incentives, in so far that they can be controlled by school districts at all, is a matter for negotiation, and in most every school district bargaining unit, older teachers hold the preponderence of voting strength. In efforts to compress the salary schedule, front-loading inducements to the young, efforts to change the length of the school day and even those to enforce the assignment and marking of homework may meet with more resistance than enthusiasm. Restructuring or staging teaching

careers so that they will provide long-term and periodic rewards and incentives is a difficult and complex problem (Sykes: 1983, 121), but it is one much more likely to find a sympathatic audience among the current labor force of teachers, the majority of which finds itself solidly midcareer.

The flatness of teacher age distribution throughout the mid-career years suggests that teaching, contrary to the findings of Waller in the 1930s and Lortie in the 1960s, is beginning to be considered a career by those who teach. Changes in the female labor participation rate for ages 20-45 clearly suggest persistance and career as opposed to immediate income orientation. A substantial majority of those over 40, and 40 percent of those over 30, plan to stay till retirement (Bartholomew and Gardner, 1982: 243). In addition, we find substantial evidence of career preparation. Between 1970 and 1980 the portion of doctorates in education awarded to females increased from 14 to 31 percent, and the percentage of master's degrees increased to 40 percent. (Golladay, 1983: 14).

If teaching is increasingly a career, then reforms such as career staging, renewal opportunities, participation, mentorship and substantative evaluation need to be applied, and a litany of these reforms has been presented elsewhere, notably in the recently published *Handbook of Teaching and Policy* edited by Shulman and Sykes. Performance incentives can be of a wide variety of both monetary and non-monetary forms, and importantly

can be directed to group and institutional levels as well as to individual teachers. Among the most consistently potent of these performance reforms has to do with the flow of arising from the interaction of teacher and student. (See Mitchell, Ortiz and Mitchell, 1983, for a review of the rewards and incentives literature.) But because the motivation to participate is different than the motivation to perform, reforms that work to establish satisfying and productive careers are not the same ones that will insure a flow of talented novices into those careers.

The Teacher Competence Issue

It has proven difficult to attract talented novices to education. In the aggregate, the sands of teaching are found in the cove of last choice among talented college graduates. The question is, does this matter? We know that teachers as a group have never done very well on tests of academic ability, that the relationship between teacher verbal ability and student outcomes is modest, and that a host of research has been unsucessful in finding a relationship between a host of teacher characteristics and student outcomes. Even so, as Sykes puts it "generations of teachers have served America's youth tolerably well," (Sykes: 1983, 114). Still, the cutting edge of reform slices toward providing mass education that moves beyond basic skills toward the higher order skills of synthesis, argument and reasoning.

These changes will not be the product of an occupation that stood last in line at the labor queue.

It is difficult for public policy to manipulate the cultural incentives, such as status and regard, that make teaching less attractive than it might otherwise be. The more manipulable incentives to participate have to do with salary and structuring the quality of teacher work life. Both involve money, the theoretically and historically honored way of attracting people to jobs or occupations. The literature on the movement of college manpower, and particularly the literature on teacher job mobility, suggests that price theory is well confirmed. In Freeman's (1971) study of scientific talent increases in the supply of new students correlated .71 with increases in starting salaries. In Baugh and Stone's study of teacher mobility a one percent increase in salary decreased the probability of field leaving by .14.

If potential teachers respond like economic beings, we can expect a relatively quick return of students to teacher education when it becomes apparent that teaching vacancies will be available. This should be particularly true because of the general glut of college trained manpower. During this decade the number of college graduates each year is nearly double the number of positions available in the professional/technical and managerial segment of the labor market -- more than 900,000 bachelor's graduates and fewer than 450,000 jobs (Carey, 1981).

Teaching jobs form a major share of the professional and technical positions that will come available. Even though the field will continue to contract somewhat, the country will need between 100,000 and 200,000 new teachers each year during the rest of the decade compared to approximately 36,000 engineers, 14,000 physicians, 17,000 computer systems analysts and 12,000 lawyers (Carey, 1981: 49-50).

These are not the conditions that are most condusive to increases in the real wages of teachers in comparison to the wages of other workers. The relative insensitivity of the teacher labor market to qualitative differences in its applicants has already been noted, and in large measure this difference is structural. Because teaching is a certified, credentialed occupation, the market responds to shortages of credentials rather than shortages of quality. Chronic shortages of credentialed teachers are unlikely during this decade of extraordinary college graduates. Thus, it is difficult to depict a scenerio in which the real wages of teachers would advance sharply relative to those of other workers. It is even more difficult to advance a scenario in which a government could be found willing to pay for such advances. A recent analysis of state fiscal capcity shows increasing competition for resources and a declining fiscal base (Garms and Kirst, 1980). The U.S. Department of Education's School Finance Project (1983) placed nearly half the projected population by the year 2000 in states

with unfavorable prospects for financing its schools.

The one policy mechanism that offers promise of improving the academic capability among entering teachers is stringent control over the academic skills of those entering teaching. This strategy, being applied in some form by 23 states, runs the danger of inducing an apparent shortage of qualified teachers, but in fact if the underqualified were turned away any shortage in applicants would simply be the revelation of a shortage that has been present all along. Teacher competency tests have, indeed, reduced the pool of potential teachers. In the most recent administration of the California Basic Educational Skills Test, one third of the applicants failed one of the three sections -- reading, writing or math (Savage, 1983).

There are formidable obstacles against the use of this strategy. Teacher training institutions, which are largely state colleges and universities, are charged with producing an adequate supply of teachers. In addition, the budgets of those state schools of education rests on the generation of student enrollment. For schools of education incentives have been not to control the supply or quality of teachers, but conversely to solicit enrollment and relax standards for admission to the point that 48 percent of the teacher education programs in the country have minimum entry grade point average requirements less than 2.0 (Barnes and Tierney, 1982).

Nonetheless, if legislatures, boards and superintendents have the tenacity to enforce pertinent academic achievement standards, we can be assured of the capacity of entering teachers. Then, if shortages exist it will be apparent that the problems of teacher salary and worklife quality need attention. If that should happen, powerful price and job quality incentives would come into place, and teachers would be treated as valued commodities.

References

Carol P. Barnes and Dennis S. Tierney, "Problems in Operationizing the Quest for Quality in Teacher Education," Stuty sponsored by the California Council on the Education of Teachers, 1982.

Bernard Bartholomew and Suzanne Gardner, *Status of The American Public School Teacher, 1980-81* (Washington: National Education Association), 1982.

William H. Baugh and Joe A. Stone, "Mobility and Wage Equilibration in the Education Labor Market, (Eugene: Center for Educational Polidy and Management, University of Oregon) n.d.

California State Department of Education, "Characteristics of Professonal Staff in California Public Schools, 1981-82. Sacramento, 1982.

Max L. Carey, "Occupational Employment Growth Through 1990," *Monthly Labor Review*, 104,8(August 1981): 44-55.

Barry Edmonston and Thomas R. Knapp, "A Demographic Approach to Teacher Supply and Demand," *American Educational Research Journal* 16,4 (Fall 1979): 351-366.

Education Week, "A Survey of the States," 2, 39 (July 27, 1983): 25.

Jack Fiorito and Robert C. Dauffenbach, "Market and Nonmarket Influences on Curriculum Choice by College Students," *Industrial and Labor Relations Review*, 36,1(October 1982): 88-101.

Martin M. Frankel and Debra E. Gerald, *Projections of Education Statistics to 1990-91* (Washington: National Center for Education Statistics), 1982

Richard B. Freeman, *The Market for College-Trained Manpower* (Cambridge: Harvard University Press) 1971.

Mary A. Golladay, "Graduate Study In Education: An Analysis of Institutions and Degree Awards, 1971-1981," presented American Educational Research Association, Montreal, Canada, April 11-15, 1983.

Phillip M. Hauser, "The Census of 1980," *Scientific American* 245,5 (November 1981): 53-61.

Gregory Jackson, George Masnick, Roger Bolton, Susan Bartlett and John Pitkin, *Regional Diversity* (Boston: Auburn House) 1981.

Donna H. Kerr, "Teaching Competence and Teacher Education in the United States," pp. 126-149 in Lee S. Shulman and Gary Sykes, *Handbook of Teaching and Policy* (N.Y.: Longmans), 1983.

Michael W. Kirst and Walter I. Garms, "The Demographic, Fiscal and Political Environment of Public School Finance in the 1980s," Stanford University Institute for the Study of Educational Finance and Governance, Policy paper 80-C1.

Dan C. Lortie, *Schoolteacher: A Sociological Study* (Chicago: University of Chicago Press) 1975.

George Masnick and John Pitkin, "Cohort Projections of School-Age Populations for States and Regions: 1985 to 2000," MIT/Harvard Joint Center for Urban Studies, 1982.

Douglas E. Mitchell, Floria Ida Ortiz and Tedi K. Mitchell, "Controlling the impact of Rewards and Incentives on Teacher Task Performance," Final Report, National Institute of Education Grant 80-0154, December 1983.

Richard J. Murname, "Teacher Mobility Revisited," 16, 1 (Winter 1981): 3-19, *Journal of Human Resources*.

Allan C. Ornstein, "Teacher Salaries: Past, Present, Future," *Phi Delta Kappan*, 61,10(June 1980): 677-679.

Valena W. Plisko (ed.) *The Condition of Education, 1983 edition* (Washington: U.S. Department of Education), 1983.

Russell W. Rumberger, *Overeducation in the U.S. Labor Market* (New York: Praeger) 1981.

David G. Savage, "More Than Half on 2 Campuses Fail Teacher Test," *Los Angeles Times* Aug. 9, 1983, B-1.

Phillip C. Schlechty and V.S. Vance, "Do Academically Able Teachers Leave Education? The North Carolina Case," *Phi Delta Kappan* 62, 2(October 1981): 106-112.

Lee S. Shulman and Gary Sykes (eds.), *Handbook of Teaching and Poli*[illegible] (N.Y.: Longmans), 1983.

Sandra Smith and associates, "Improving the Attractiveness of the K-12 Teaching Profession in California," California Round Table on Educational Opportunity, 1983.

James A. Sweet and Linda A. Jacobsen, "Demographic Aspects of the Supply and Demand for Teachers," pp. 192-213 in Lee S. Shulman and Gary Sykes (eds.), *Handbook of Teaching and Policy* (N.Y.: Longmans), 1983.

Gary Sykes, "Public Policy and the Problem of Teacher Quality: the Need for Screens and Magnets" pp. 97-125 in Lee S. Shulman and Gary Sykes (eds.), *Handbook of Teaching and Policy* (N.Y.: Longmans), 1983.

Lester C. Thurow, "Education and Economic Equality," *Public Interest* 28 (Summer 1972): 66-81.

U.S. Bureau of Census, *Current Population Reports, Series P-20, No. 358.*

U.S. Department of Education, School Finance Project, "Prospects for Fiancing Elementary/Secondary Education in the States," December 1982.

Willard Walker, The Sociology of Teaching (N.Y.: Russell and Russell 1961.

W. T. Weaver, "In Search of Quality: The Need for Talent in Teaching," *Phi Delta Kappan* 61,1(September 1979): 29-32, 46.